

► INFORMATION SHARED FROM  
THE WELDING INDUSTRY  
ROUNDTABLE

Strategies for Developing Tomorrow's Welding Professionals

welding professionals

# Roundtable

SEPTEMBER 9 | **2011**  
**CHICAGO**



**Foundation, Inc.**

Building Welding's Future through Education



**Weld-Ed**

National Center for Welding Education and Training

# AWS Weld-Ed

education  
technology



## **Foundation, Inc.**

*Building Welding's Future through Education*

### **About AWS**

**The American Welding Society (AWS)** was founded in 1919 as a multifaceted, nonprofit organization with a goal to advance the science, technology and application of welding and related joining disciplines. The AWS Foundation was established by AWS in 1989 to provide educational scholarships and has evolved to include workforce development programs that ensure the growth and development of the welding industry through strengthening research and educational opportunities in welding and related industries.



## **Weld-Ed**

National Center for Welding Education and Training

### **About Weld-Ed**

**The National Center for Welding Education and Training (Weld-Ed)** is a national partnership of colleges, universities, professional societies, and private industry committed to increasing the number and quality of welding and materials joining technicians to meet industry needs. Weld-Ed strives to improve the quality of education and training services to address the hiring and professional development needs of the welding and materials joining industry.

# The Challenge: It's time to come together to solve a potential national crisis.

*“The frightening fact is that 82 percent of our nation’s manufacturers have a moderate to serious shortage in their skill production workforce—82 percent! It’s not that we don’t have enough people, it’s that we don’t have enough people with the right skills in the right place”*

JENNIFER MCNELLY, THE MANUFACTURING INSTITUTE, 501(C)3 AFFILIATE OF THE NATIONAL ASSOCIATION OF MANUFACTURERS  
*\*results from the 2011 Skills Gap Report*

The results of a thorough examination of the labor market needs of the welding industry show there were consistently needs in different regions throughout the U.S. for up to 10% of the overall number of welding professionals to be replaced, predominantly due to retirements. An analysis of projected data that was gathered through the efforts of the National Skill Panel (NSP) show that **between 2009 and 2019 there will be a need for at least 238,692 new and replacement welding professionals.** *\*State of the Welding Industry Report*

*“With the shortage of welders, pipe fitters and other high-demand workers likely to get worse as more of them reach retirement age, unions, construction contractors and other businesses are trying to figure out how to attract more young people to those fields.*  
 —SKILLED TRADES NEEDS WORKERS, WALL STREET JOURNAL, AUGUST 19, 2008

The American Welding Society is determined to work with educators, suppliers and industry experts to find a solution for this welding professional shortage and *keep this country moving forward!*

multifaceted  
 partnership

UPDATED STUDENT METRICS				
Quantitative Metrics: Welding Enrollment				
	2007/2008 Academic Year	2008/2009 Academic Year	2009/2010 Academic Year	2010/2011 Academic Year*
	Enrolled/Completed	Enrolled/Completed	Enrolled/Completed	Enrolled*/Completed*
<b>Secondary</b>	100,870/50,400	112,410/68,550	139,335/73,869	140,000/78,000
<b>Post-Secondary</b>	89,030/35,970	89,330/23,940	72,454/25,854	76,000/27,000
				*estimated figures



**On September 9, 2011**, about 80 Welding industry representatives, including secondary and post-secondary educators, union representatives, policy-makers, welding suppliers and employers of welding professionals in construction, heavy equipment, shipbuilding, nuclear power and repair, met at the Crowne Plaza Hotel near Chicago O’Hare’s airport to discuss solutions to the looming skilled welder shortage.

The morning session involved 18 panelists who discussed their organization’s challenges in the following areas:

- Challenges faced by employers in recruiting, training, and retaining welders and other welding professionals.
- Challenges faced by educators in recruiting, educating, and retaining students in welding-related programs.
- Organizational impacts from new technologies, advancements in welding, and globalization.
- A need for creative solutions and partnerships to educate and hire the right people.

In the following pages you will read some of the critical issues that many of the panelists discussed. The final pages include charts with possible solutions to these issues. These are not meant to be absolute solutions to the welding shortage problems but rather, important points of discussion and the beginning of an ongoing dialogue to lead to implementations that will keep the U.S. manufacturing industry in a leadership position.

# challenges solutions

**FACILITATORS:**



**Dean Wilson:** Director of Global Business Development, Jackson Safety Products, a division of Kimberly-Clark Professional



**Monica Pfarr:** Corporate Director for Workforce Development, for the American Welding Society and Chief Investigator for Weld-Ed



**Jennifer McNelly:** Executive Vice President, The National Association of Manufacturers' The Manufacturing Institute

**INDUSTRY EXECUTIVES:**



**Ray Shook:** Executive Director of the American Welding Society



**Jeff Allman:** Director of Operations Training and Workforce Management for Ingalls Shipbuilding



**George Blankenship:** President, North America, for The Lincoln Electric Company



**Glenn Campbell:** Project Manager for Bechtel Power



**Michael Castner:** Strategic Account Sales, Research and Development, Product Management and Pricing Strategy, ESAB



**Lin Chapé:** Senior Human Resource Director, Vermeer Corporation



**Chris Heitzman:** Manager, U.S. Learning and Recruitment Team, Caterpillar, Inc.



**Kurt Hofman:** Vice President, RoMan Manufacturing Inc., and President, RoMan Engineering Services



**Jimmy Morgan:** Leader of Installation and Modification Services, Westinghouse Electric Company



**Sundaram Nagarajan:** Executive Vice President, Illinois Tool Works, Inc.



**Lloyd Robinson:** President, AWISCO International Gases, and President, GAWDA (Gas and Welding Distributors Association)

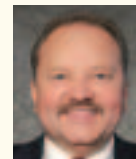
**EDUCATIONAL LEADERS:**



**Patricio Mandez:** Professor of Chemical and Materials Engineering, University of Alberta



**Mike Pelegri:** Welding Instructor, Pipefitters Union Local 597, Chicago



**Dr. Elton Stuckly:** President, Texas State Technical College, Waco



**Kelly Zelesnik:** Dean of the Engineering Technologies Division and the Nord Advanced Technologies Center, Lorain County Community College

# partnerships recruitment competitiveness



## CRITICAL SHORTAGE AREAS:

Materials engineers  
Engineering technicians, except drafters  
Welders, cutters, solderers, and brazers  
Welding, soldering, and brazing machine  
setters, operators, and tenders  
Inspectors, testers, sorters, samplers

*“We are about value-add. We are about innovation. And in the construct of that what we have never managed to do is actually look at our most important asset; our people as part of our human capital development.”*

JENNIFER MCNELLY, NATIONAL ASSOCIATION OF MANUFACTURERS

## 1. Challenges faced by employers in recruiting, training and retaining the right people.

*“Large and medium-sized manufacturers do in fact have the flexibility and commitment to make investments in their workforce and the small guys are struggling and we as a nation can’t afford to lose anyone in this process.”*

—JENNIFER MCNELLY, NATIONAL ASSOCIATION OF MANUFACTURERS

*“We find that recruiting welders from the younger generations is very challenging. But the biggest problem we’re going to face is that our best welders are between the ages of 50 and 57 and when they retire we will have a large gap.”* —JIMMY MORGAN, WESTINGHOUSE ELECTRIC COMPANY.

*“You can teach people to weld. It’s much more difficult to teach them a work ethic.”*

—SUNDARAM NAGARAJAN, ILLINIOS TOOL WORKS

*“It’s a challenge that we face in technical education that it’s trying to recruit the students into areas that are not seen as what I would call popular career fields.”* —ELTON STUCKLY, TEXAS STATE TECHNICAL COLLEGE, WACO

*“We are using virtual reality machines in our promotional trailers. We go to NASCAR races, air and water shows, high schools, agricultural shows, science shows, parades...you name it. We are all over the country with these promotional trailers. We are trying very hard to bring people in. We have a dedicated recruiter just to recruit women.”* —MIKE PELEGRINO, UA LOCAL 597, CHICAGO

## 2. Challenges faced by educators

*“I will tell you education is on the precipice of change in this nation, because we don’t have enough money to support business as usual. We face huge structural costs that are becoming less accessible.”* —JENNIFER MCNELLY, NATIONAL ASSOCIATION OF MANUFACTURERS

*“Working in a college environment, it’s very hard for colleges to keep up with the changes in technology. Number-one problem is the expense, but also technology changes so rapidly it’s hard to foresee and provide the resources for those immediate changes.”* —ELTON STUCKLY, TEXAS STATE TECHNICAL COLLEGE



*"We recruit from a pipeline coming from community colleges that have well-established welding programs, but some of the facility specific technology that we have to then train our new employees on causes us to have to maintain our own training labs and our own set of instructors, which poses some major challenges for us." —CHRIS HEITZMAN, CATERPILLAR CORPORATION.*

### **3. Organizational impacts from new technologies**

*"I believe that it's more important to economies like the U.S. because we are driven ever more toward increase efficiency to maintain our competitiveness. And, when we drive toward increased efficiency we're driving a greater reliance on technologies, and I think a lot of our product development and what we see our customers developing in terms of their product is oriented highly toward automation." —GEORGE BLANKENSHIP, LINCOLN ELECTRIC*

*"Employers complain that students coming out of college or trade schools are not prepared for the high level of technology that they're implementing. They're coming out of schools knowing the fundamentals but not implementing the newest technology. I have to then train my own employees. It will take me 2 to 3 years to get people up to speed on implementing this new technology"*  
—MICHAEL CASTNER, ESAB

*"To embrace the new technologies, we are going to have to get the skill levels up. What I don't want us to do is go charging down the path of welding technology to the point where we're using an automated process and we've taken the welder out of the process."*  
—GLENN CAMPBELL, BECHTEL

### **4. Creative solutions and partnerships to educate and hire the right people**

*"One thing that we have worked on in the last couple of years is more company-sponsored students where business and industry actually go in and recruit students and interview those individuals they feel they would want to work for them when they get a degree or a certificate. Those companies sponsor those students to come to TSTC." —ELTON STUCKLY, TEXAS STATE TECHNICAL COLLEGE*

*"Instead of looking at work-based learning or co-oping as a six-month endeavor, where someone steps out for six months and goes back to school, it's really more about integrating work through every semester that they are taking courses. It doesn't force them to quit their full-time job. Many of our students can't, but it establishes a relationship with more than one employer. And the employer gets to know the students, and says, 'yeah I'd like to invest in them and have them come back.'" —KELLY ZELESNIK, LORAIN COUNTY COMMUNITY COLLEGE*

*"Employers have a critical need and the AWS is trying to increase the number of students who are enrolling and graduating from programs. We need to ensure that those graduates have the right skills and competencies to fill the open positions."*

—MONICA PFARR, AMERICAN WELDING SOCIETY

technology resources  
flexibility

# The AWS Foundation in Action

# enthusiasm services

# Weld-Ed

The American Welding Society and the AWS Foundation strive to enhance the field of welding through education, support and resources. We work closely with Weld-Ed and other partners to continue to provide the services our members most need.

Based on the information from the panels and the brainstorming sessions from the afternoon group exercises, we have come up with some **specific plans** to either augment existing strategies or consider adding new ones.

## BUILD ENTHUSIASM FOR WELDING

- Develop STEM (Science, Technology, Engineering, Math) lesson plans for elementary, middle and school students with welding application.
- Create excitement for careers in welding by highlighting: earning potential, professionalism of the industry, stable job outlook, portability, breadth of options, and more.
- Invite parents and students to Showcase Days and competitions that the AWS holds and/or sponsors around the country. Some examples are:
  - Student nights at local AWS section meetings
  - College career expos
  - High school open houses
  - FFA National Convention
  - SkillsUSA National Competition

AWS interacts with literally thousands of students and parents each year at these events.

- Invite students, parents, educators, career counselors to tour industrial and manufacturing facilities to learn about the varied careers, highly technical equipment, etc., available in welding.
- Get counselors to events and educate them on welding career opportunities such as the events offered by AWS and our industry partners, which more than 175 educators have already attended.
- Promote “Image of Welding” awards given annually by AWS to educators, industry, and individuals who are actively engaged in promoting the industry and creating excitement for welding careers.
- Produce and distribute media that highlight successful welding students and interesting as well as varied career paths offered in the welding industry.

## EXPAND INDUSTRY/EDUCATION COLLABORATION

- Organize regional skills panels where industry and education representatives identify the skills and competencies necessary for graduates and secondary and post-secondary welding programs, such as the skills panels organized by Weld-Ed at each of its 11 educational partners.
- Allow students access to the latest technology by working with manufacturers/distributors to donate equipment or sell the latest technology to schools at a greatly reduced price.
  - Example: OKI Bering and AWS distribute overstocked welding materials and supplies to regional educators.

- Work with local industry to develop internship opportunities for students through school advisory boards.
- Develop and promote opportunities for current employees to advance their education, obtain new skills, and enhance their outlook for promotion through the AWS Workforce Development Grant Program. This fund assists education/industry partners to upskill their employees to make them more competitive on new project bids.
- Explore implementing a local “Welding Ambassador” program through Weld-Ed where industry participates in speaking at schools, hosting facility tours, working with students to promote welding careers, etc.





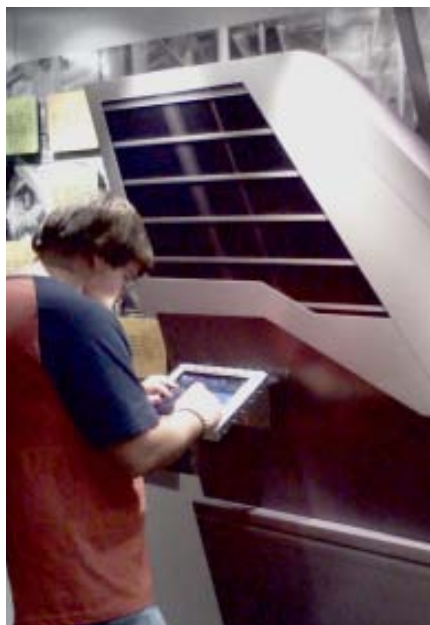


"AWS Careers in Welding" mobile exhibit

### FLEXIBILITY IN EDUCATION & TRAINING

- Develop certifications tied to industry-specific needs in conjunction with education so employers can hire employees with skills that limit the learning curve.
- AWS is working with NAM (National Association of Manufacturers) on the NAM Endorsed Manufacturing Skills Certification System, an organized group of nationally portable, industry skills certifications applicable to entry-level jobs in advanced manufacturing.
- Skills can be taught in programs of study beginning in high school and progressing through community college and university curricula.
- Skills certifications are stackable, with the skills learned in chunks of curriculum and measured by gaining competencies, not through seat time or credit hours.
- Skills certifications are integrated into degree programs where educational pathways are aligned to career pathways for each certification.
- These pathways provide more "on-ramps" to postsecondary education to learn high-level skills, and more "off-ramps" to employment with industry credentials that have value in the workplace.

- Collaborate with schools (colleges and universities) to simplify the ability for students to transfer credits.
- Expand student opportunities to participate in youth development programs such as the ones that AWS and Weld-Ed are involved with, including SkillsUSA, FFA and others at the local, regional and national levels.
- Communicate the value of nationally-recognized skills standards such as the AWS SENSE (Schools Excelling through National Skill Standards Education program). Upon successful completion of each level of the standards and guidelines, students may test to receive a certificate of completion. Level I is designed for application at grades 10-12 or entry level. Level II is designed for two-year career and technical education programs or for those with welding experience. Level III is for those in four-year programs or those with advanced experience.



**THE 53-FOOT, SINGLE EXPANDABLE TRAILER FEATURES 650 SQUARE FEET OF EXHIBIT SPACE, INCLUDING FIVE LINCOLN VRTEX 360 SIMULATOR STATIONS.**

*"There is a real need for welders in today's workforce, and the Careers in Welding Trailer is a fun and interactive way to go around the country to recruit young people and give them the opportunity to explore what welding is all about,"* said Monica Pfarr, corporate director, workforce development, American Welding Society.

*"AWS is successful because of the companies and individuals who devote time and effort to making a difference. We need your continued support and involvement in our workforce development initiatives".*

— SAM GENTRY, AWS FOUNDATION EXECUTIVE DIRECTOR

# Appendix: Afternoon Critical Issue Discussions

The following tables outline the discussions held in the afternoon session. Each work group was assigned a critical issue and documented both current best practices as well as potential solutions to their challenge.

**CRITICAL ISSUE: #1** Employer sponsored education (access to facilities, instructors, equipment, internships)

## CURRENT BEST PRACTICES

1. Co-ops with local training center and machine consignment partnerships
2. In house training by employer and customized training at outside training facility

## POSSIBLE FUTURE BEST PRACTICES (WHAT ATTRIBUTES ARE NEEDED FOR SUCCESS?)

- Leveraging 2nd and 3rd shifts at manufacturing plant to use for training
- Faster training/night classes
- Anybody with Minimum Requirement
- Specialized Apps

## BEST PRACTICES: IDEAS

- Co-ops with local colleges
- Sponsor specialized, targeted training
- Flexible school schedule around work commitments
- Partnerships between colleges and manufacturers, offering equipment in exchange for training
- Scholarship/tuition
- Foundational training at the school level and then technical training at the manufacturer's facility
- Focus on employees in the second and third shifts
- Employer establishes in-house training facility for current students/ employees
- Colleges to customize training programs to fit the needs of employers

**CRITICAL ISSUE: #2** Common core competencies with career pathways grounded in basic academics for success.

## CURRENT BEST PRACTICES

1. Sense Program Entry Level (1) High School
2. Apply Name Endorsed Skills Certain System at High School Level
3. Involvement Skills USA
4. Internship with specific companies at high school level
5. Release Time for H.S. Students to Attend Tech Schools if not on campus

## BEST PRACTICES: IDEAS

- |   |   |
|---|---|
| • Return to aim early for a technical career                        | • Collaboration among schools to transfer credits                 |
| • Appropriate certification structures                              | • Redefine what degree requirements are needed for career workers |
| • Apprenticeships for postsecondary students                        | • Broader application and promotion of AWS program                |
| • Credentials allowing acceleration in the workplace                | • Better utilization of existing SkillsUSA programs               |
| • Personalize certification in the educational pathway              | • Donation of equipment to help students with real-world problems |
| • High school students to get some exposure in college and industry | • Communicate value of SENSE to schools and industry              |
| • Better awareness of career paths by guidance counselors           |   |
| • Create technical charter schools?                                 |   |

**CRITICAL ISSUE: #3** Parents/Counselors/Teachers: Improving the image of the industry and being clear on what is required to be employed (drug testing, security clearances, certifications)

**CURRENT BEST PRACTICES**

1. Parent's day – Have parents come in to see facilities. K-12 Outreach—Summer camps come in and use items
2. Drip Marketing—Drip information onto students
3. Technology Career Days – Have students, parents, etc., come in
4. Future Best Practice: Tie Welding to Science

**CRITICAL ISSUE: #4** Improving the image of the industry and being clear on what is required to be employed (drug testing, security clearances, certifications)

**CURRENT BEST PRACTICES**

Video (CD)/ Technology	Internships
Literature	Images
Virtual trainer	Awards

**BEST PRACTICES: IDEAS**

- Videos
- Improvements
- Career day information about drug testing
- Target 25–to 35-year-old people interested in working in a trade
- Focus on parents
- Provide career information to career counselors
- Start with elementary and jr. high school students
- Provide industry tours to general public in industrial facilities
- Describe career pathways
- Provide different types of benefits
- Partnerships with companies

**CRITICAL ISSUE: #5** Identifying new pipelines to address workforce shortage

**BEST PRACTICES: IDEAS**

Early On-Elementary intervention	Academy I & II phase 10K per student
• Video game interaction	10 weeks, 14 weeks (24 hours a day)
• Career Days	Adult re-entry
Special populations	• For women: orderly, no heavy lifting, no harassment
• Military posts	• Lack of opportunity to understand
• Women	• No longer generational
• Prisoners	Variable Pell Grant rates for (STEM) Technical Education
Post-High School	College Degrees
Repurpose Career	
• Lost career	
• Displaced homemaker	

**CRITICAL ISSUE: #6** Leveraging experienced talent in new strategies to train the next generation workforce

**CURRENT BEST PRACTICES**

1. Weld camps, weld olympics, Skills Weld-Ed Module Training/PTLW, Peers
2. Mentorships/Internships, apprenticeship
3. Scholarships
4. Industry roundtable
5. Collaborative partnerships
6. Weld-Ed Module
7. Instructor training

**BEST PRACTICES: IDEAS**

- Train the trainer
- National standards
- Motivation
- Knowledge of opportunities/expectations
- Job skills
- Scholarships
- Motivation
- Schools
- Industry
- Leveraging experienced talent in new strategies to train the next generation workforce
- Experienced teaching “new guys/ladies”
- Leaders leading leaders
- Mentorships
- Technology
- Internships/apprenticeships
- Geographical needs/industry sectors
- Identify skills needed
- Job instruction
- “tricks of the trade”
- talent & skill sets

**CRITICAL ISSUE: #7** Up-skilling the incumbent workforce for new technologies

**CURRENT BEST PRACTICES**

1. Partner w/college schools
2. Partner w/ suppliers

**CRITICAL ISSUE: #8** Developing training programs that fit employer needs and constraints

**CURRENT BEST PRACTICES**

1. Do not reinvent the wheel
2. Develop a baseline of current programs offering specific skill sets/need for employees
3. Benchmarks for successful employer based requested training
4. Flexible
5. JIT delivery
6. Resources, Funds/People
7. Performance is satisfactory & improve/increase capabilities
8. Understand needs/ processes of training institute
9. Survey instruments/techniques
10. Other issues that have seemed insurmountable have been solved/resolved

*The AWS Foundation and Weld-Ed have developed both on-line and print resources to help educate, promote and encourage students to think seriously about careers in welding. We encourage you to use these resources and let us know how we can help you fulfill your welding needs.*

**[careersinwelding.com](http://careersinwelding.com)** / Order free copies of these resources under

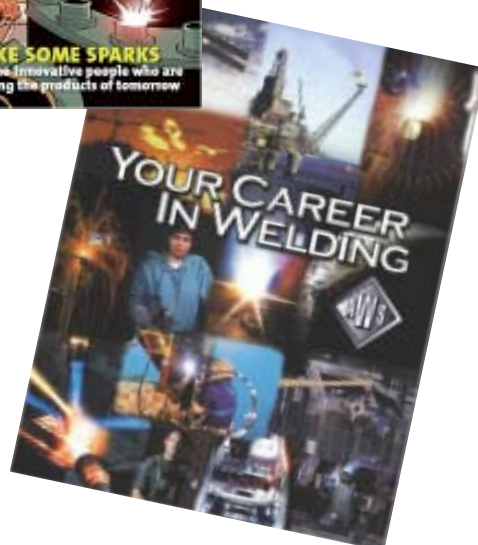
“Welding Publications” on this website

**[jobsinwelding.com](http://jobsinwelding.com)** / Job board with access to over 92% of the welding

jobs posted anywhere on the internet

**[weld-ed.org](http://weld-ed.org)**

**[aws.org](http://aws.org)**





From an overall economic standpoint, now is a great time to be in the welding profession. There are jobs available all over the world if you have the qualified skills and are geographically mobile. Through our workforce development initiatives, AWS is committed to an active role in informing, recruiting, and educating potential professionals for our industry. We will put forth the efforts needed to address the shortage of welding professionals in the United States, and help make our economy robust for the future.



—RAY SHOOK, AWS EXECUTIVE DIRECTOR